

THERMOLUMINESCENCE OF ALUMINA MACRO AND NANOSIZE POWDERS IRRADIATED WITH UV LIGHT

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Thermoluminescence (TL) has been studied in the alumina (Al_2O_3) macro and nanosize powders irradiated with UV light. The TL studies were carried out using the set-up for spectral measurements with an integrated sample heater, providing measurements of TL curves in the 20-300 °C temperature range and TL emission spectra under variable wavelength of the irradiation light.

The observed TL properties of the studied alumina samples are essentially different. The macro Al_2O_3 powder has 3 peaks (110, 170 and 280 °C) in the TL curve and 2 complex bands (around 450 and 700 nm) in the TL emission spectrum. The nanosize powder is characterized with the very low TL intensity, one peak (80 °C) in the TL curve and one band (700-800 nm) in the TL emission spectrum. TL emission spectrum of both samples contains mainly impurity bands, but Al_2O_3 nanopowder properties are determined mainly by the large specific surface and hence, the surface defects. Some of these defects are identified basing on the analysis of photoluminescence spectra and literature data.